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Mr. Hy. Orr (*Quart. Jour. Micr. Sci.*, Dec., 1888) gives some detailed observations on the development of *Amblystoma punctatum* (or *A. bicolor*) and of *Rana halecina* (or *R. palustris*), with special reference to the central nervous system, and with notes on the hypophysis, mouth and appendages, and skeleton of the head. The central nerve-system first appears as a transverse epiblastic thickening, continuous with paired elongated epiblastic dorsal thickenings. The first nerve-fibres of the brain appear on what was originally the internal surface of the primitive dorsal epiblastic thickenings. A subsequent development of nerve-fibres gives rise to a continuous ventral commissure and to the anterior and posterior commissures of the brain.

Mr. Orr considers the balancers of Amblystoma as external gills of the mandibular arch, which have become metamorphosed into embryonic organs of support.

PHYSIOLOGY.[1]

Heart-sounds.—The well known experiment of Ludwig and Dogiel, who, by excluding the blood from the heart and presumably throwing out of function the atrioventricular valves, still heard the first heart-sound, is interpreted as evidence of the preëminently muscular character of that sound. Krehl,[2] working in Ludwig's laboratory, finds yet stronger evidence of similar nature. Through the auricles he introduces a simple apparatus by which, at will, the atrioventricular valves may be held back against the cardiac walls, and thus thrown out of action or not interfered with. Observers, even physicians skilled in auscultation, are unable to perceive any differences, either in intensity or character, of the sound, whether the valves are in use or not. Bleeding the animal from the carotid does not interfere with the first sound until shortly before death, when the sound becomes feeble in accordance with the feeble beat of the heart. The experiments do not elucidate the question whether the heart-beat is a single twitch or a tetanus; if it be the former, the sound may easily be explained, as Ludwig himself has previously suggested, by the pulling or rubbing of the muscle fibres on each other. If the ventricular contractions be excluded, a distinct but feeble auricular sound is heard. This may doubtless explain the "galop-rhythm," which is characterized by the appearance of an extra sound preceding the recognized first sound, and is rightly regarded as indicative of some pathological condition.

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[2] Du Bois Reymond's *Archiv*, 1889, p. 253.

Mechanism of Tricuspid Valve..—Krehl[3] publishes a careful and detailed account, illustrated by good figures, of the action of this valve during the whole cardiac cycle.

Innervation of Renal Blood Vessels.—J. Rose Bradford's work[4] adds to our knowledge, hitherto defective, of this subject. Roy's oncometer was used and the tracing of the volume of the kidney was compared with that of the general blood pressure. The main conclusions are as follows:

1. All renal vaso-motor fibres leave the spinal cord through the anterior roots, and although a few fibres may come out as high as the 4th dorsal, it is not until the 6th dorsal is reached that they are found in any abundance. From the 6th dorsal to the 13th dorsal they are abundant; below this they are found in rapidly diminishing numbers, so that but little vaso-motorial effect is seen to follow the excitation of the 3d and 4th lumbar nerves.

2. These renal vaso-motor fibres are of two kinds, vaso-constrictor and vaso-dilator. The former are, however, by far the best developed, so that unless special methods, such, for example, as slow stimulation, are used, it is rare to get clear evidence of vaso-dilatation on excitation of any given nerve.

3. The kidney vessels receive their nerves from all the spinal nerves included in this extensive series, but most of the renal vaso-motor fibres are found in the 11th, 12th, and 13th dorsal nerves.

4. No evidence has been obtained of the existence of any vaso-constrictor fibres for the kidney vessels in the vagus nerve. The splanchnic nerve contains not only vaso-constrictor but also vaso-dilator fibres for the vessels of the abdominal viscera, and for the renal vessels amongst the rest.

5. By reflex excitation of the renal nerves through the sciatic, intercostal or vagus, active renal contraction is obtained: through the depressor, active expansion, which is, however, usually neutralized and changed into passive contraction by the great dilatation elsewhere; through a posterior root, especially of the 11th, 12th, and 13th, active expansion, due to the stimulation of afferent visceral nerve fibres. Occasionally reflex excitation produces general dilatation, and then the

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[3] Du Bois Reymond's *Archiv*, 1889, p. 289.

[4] *Journal of Physiology*, Vol. X., 1889, p. 358.

kidney (although its vessels share in the dilatation) undergoes passive shrinking. There is no evidence of decussation of vaso-motor fibres in the splanchnic, *i.e.*, the right splanchnic sends fibres to the right kidney only, not to the left.

Physiology of the Heart of the Snake.—In the Canadian *Record of Science*, Vol. II., No. 8, Oct. 1887, is given an account by T. Wesley Mills of a study of the heart of the snake, which closes with the following summary:

1. The investigations recorded in this paper were made in mid-winter, on fasting but not hibernating animals.
2. Comparison of the vagi showed that in every instance both nerves were efficient; but usually the right was the more so; in some cases the difference, if actual, was minimal.
3. Stimulation of the vagi leads to after increased force and frequency of beat, or the former only, and according to the law of inverse proportion previously announced by the writer.
4. The mode of arrest of the heart is identical with that noted in chelonians, fish, etc.; the same applies to the mode of recommencement.
5. During vagus arrest, the *sinus* and *auricles* are inexcitable.
6. There are certain peculiar cardiac effects not explicable by reference to the vagi nerves alone, but which put the sympathetic system of nerves in a new light.
7. Direct stimulation of the heart confirms results previously noted by the writer for other cold-blooded animals. Arrest is, in all the animals of this class yet examined, owing to stimulation of the terminals of the vagi within the heart's substance.
8. As regards independent cardiac rhythm, the results have been negative.
9. The heart of the snake, upon the whole, seems to lie physiologically between that of the frog and that of the chelonians. X.

ARCHÆOLOGY AND ETHNOLOGY.

Aboriginal remains near Old Chickasaw, Iowa. On the west side of the Little Cedar River, about one and one-half miles below Old Chickasaw, Iowa, are located ten mound-builder mounds.

The same locality, by disease, war, emigration, or other causes, may have been depopulated and again repeopled by other races, each